

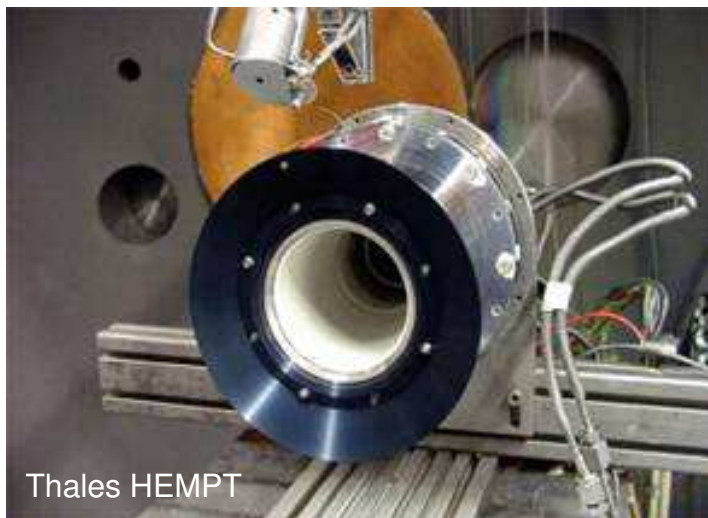
# Electric Propulsion Innovation & Competitiveness

## Qualification of EP Systems

*AEROSPAZIO Tecnologie s.r.l. - Rapolano Terme, Siena, Italy*

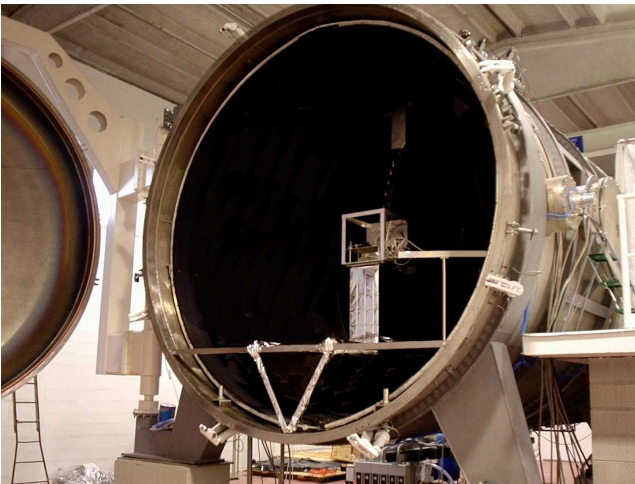
## Electric Propulsion test services

- performance testing of plasma and ion thrusters
- endurance, lifetime and more in general qualification testing according to customers standards
- EP compatibility with spacecraft subsystems
- EP/EMI testing in vacuum environment

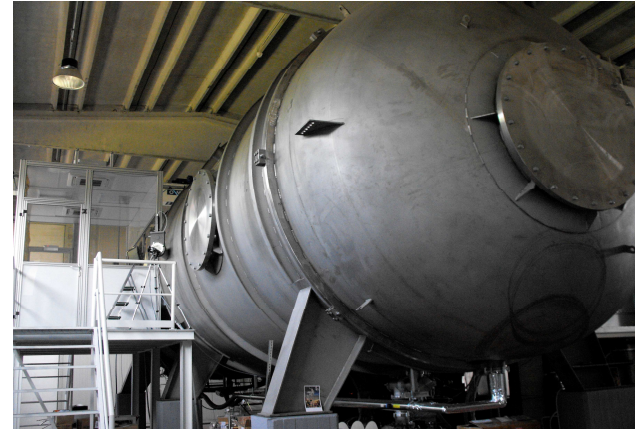




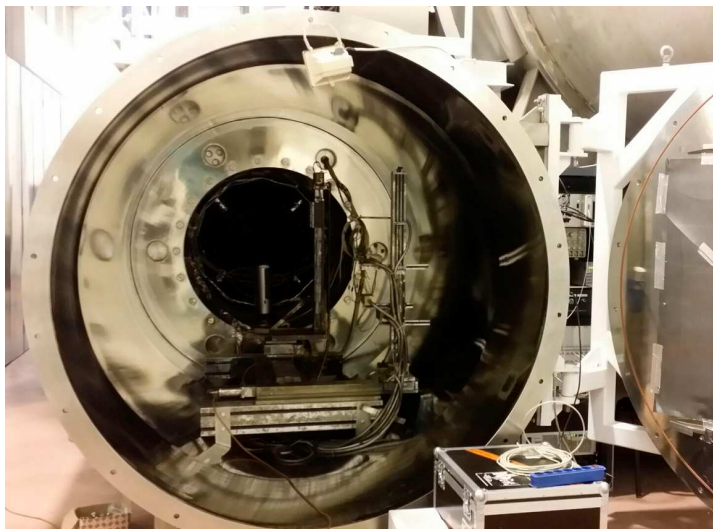
# LVTF-1



## LVTF-2



**MVTF-1E**

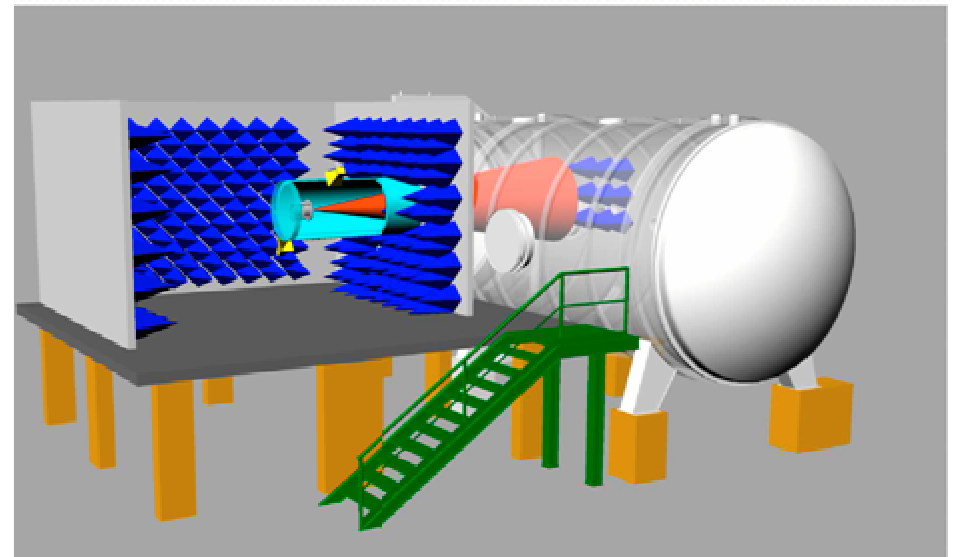
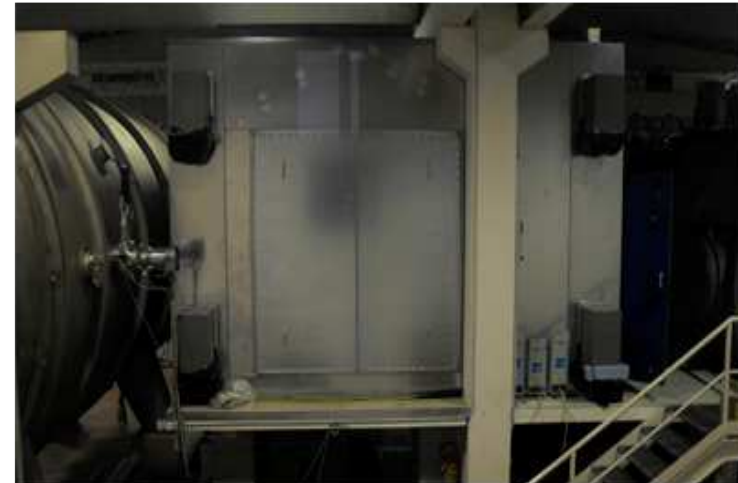


**MVTF-2**



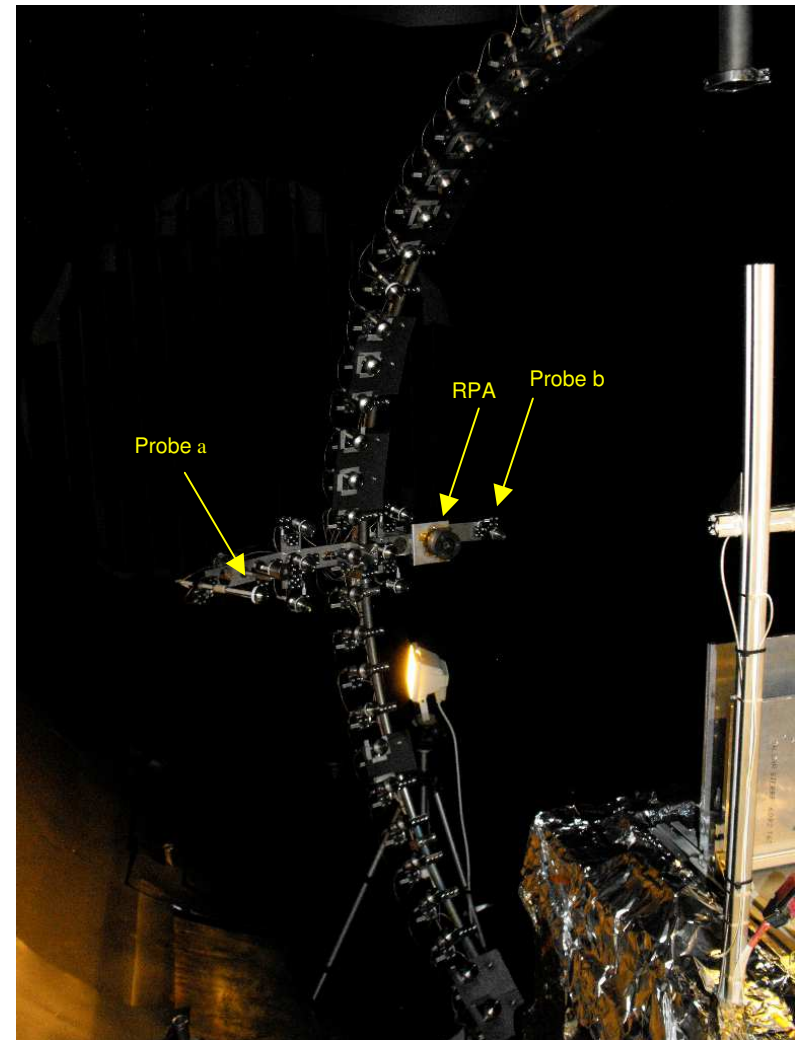
**MVTF-3 & 4**





## Probe set-up on the diagnostics boom

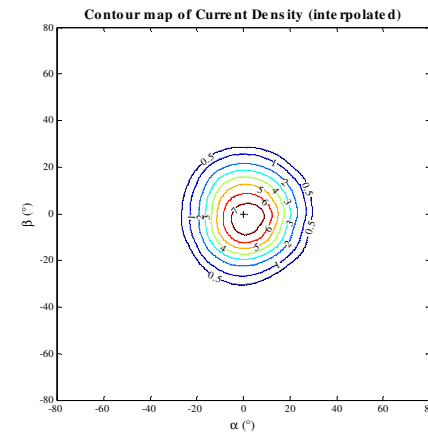
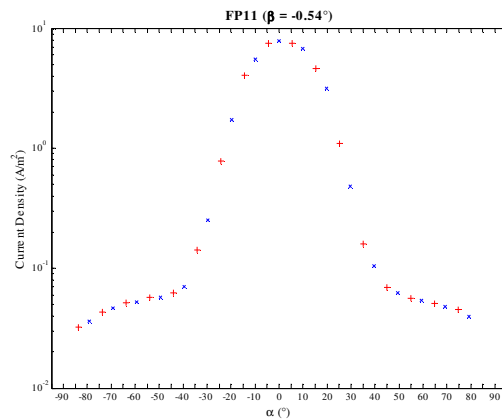
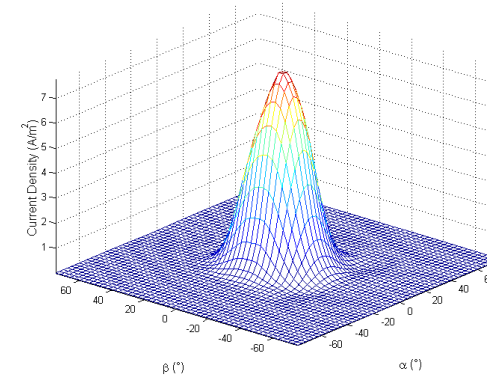
- The diagnostics boom is moved by a stepper motor which is controlled by a PC based system
- The boom can be rotated around the thruster axis.
- Typical range of rotation depends from the mechanical constraints placed around the thruster (e.g.  $-100$  to  $100$  deg with thrust balance installed).
- 34 **Faraday Probes** placed at different angular positions on the arm (each  $5$  deg from  $\beta = -80$  to  $+85$  deg). It allow to measure the ion current  $1$  m from the thruster at different angles from the centerline.
- additional probes are mounted on the boom for special measurements.
- 2 **RPA** are available on the diagnostic boom.



## Faraday probes

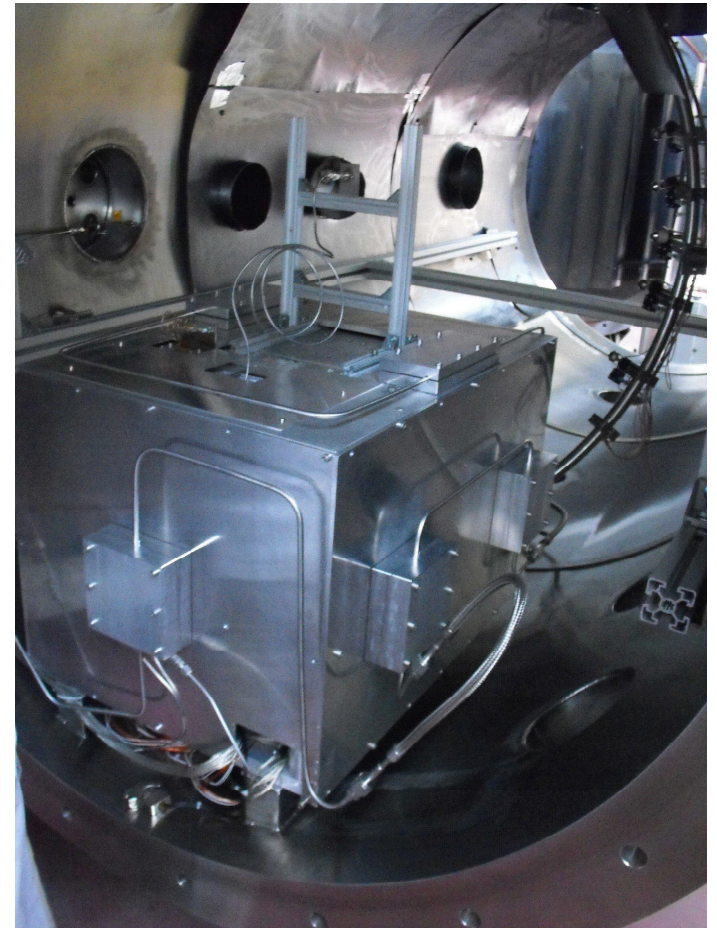
- current density plot for each Faraday probe
- current density 3D plot
- current density contour plot
- beam current
- beam divergence
- beam axis deviation
- test report generated automatically

Current Density 3D graph (interpolated)



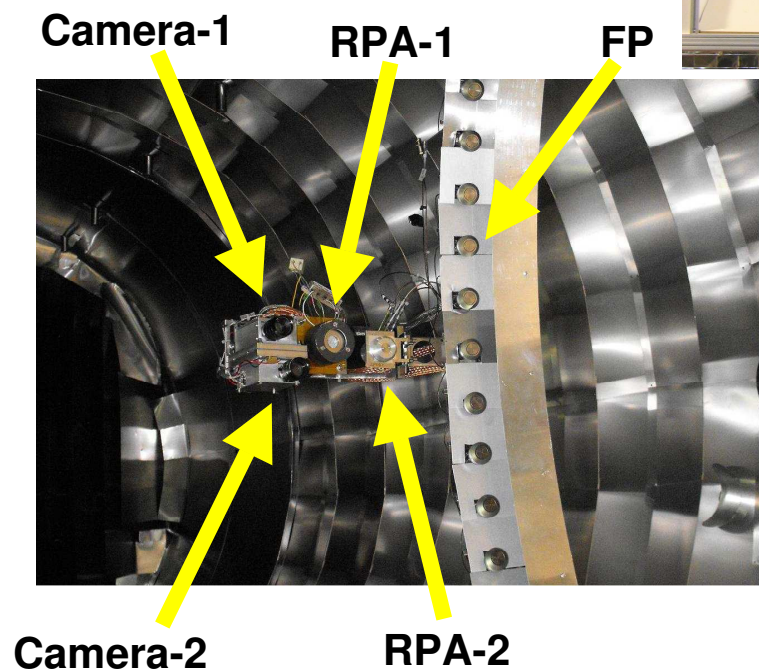
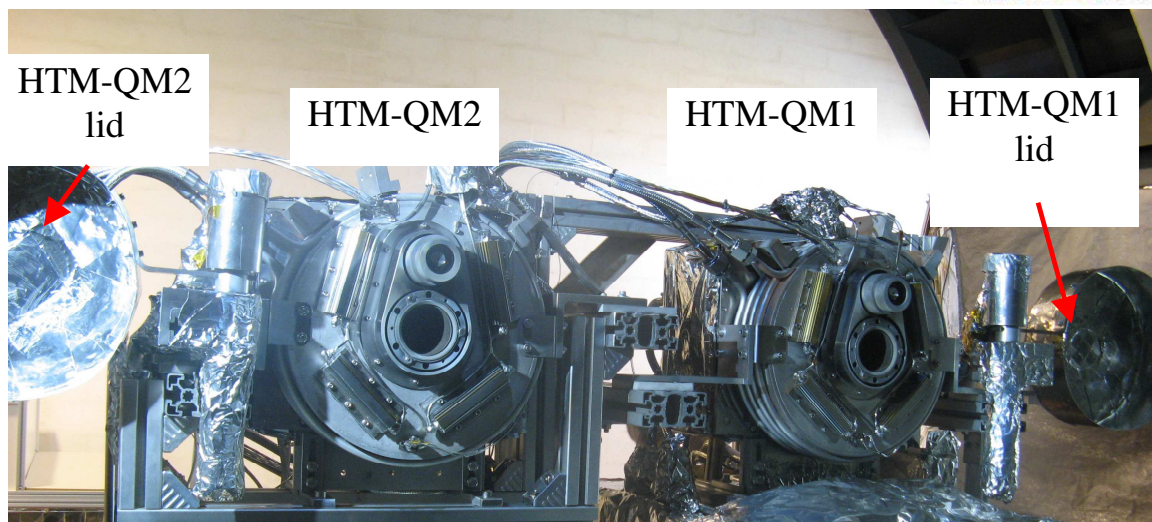
### Thrust Balance

- Null-type measurement principle
- Water-conditioned chassis
- In situ calibration system
- 30+ power lines
- 10+ thermocouples
- 10+ PT1000 sensors
- Accuracy =  $\pm 1.5$  % over single accurate measurement  
 $\pm 2.5$  % over long duration firing
- Variable measurement ranges: from mN to 1N+
- Resolution, depending on range from  $< 0.2$  mN to  $< 0.02$  mN





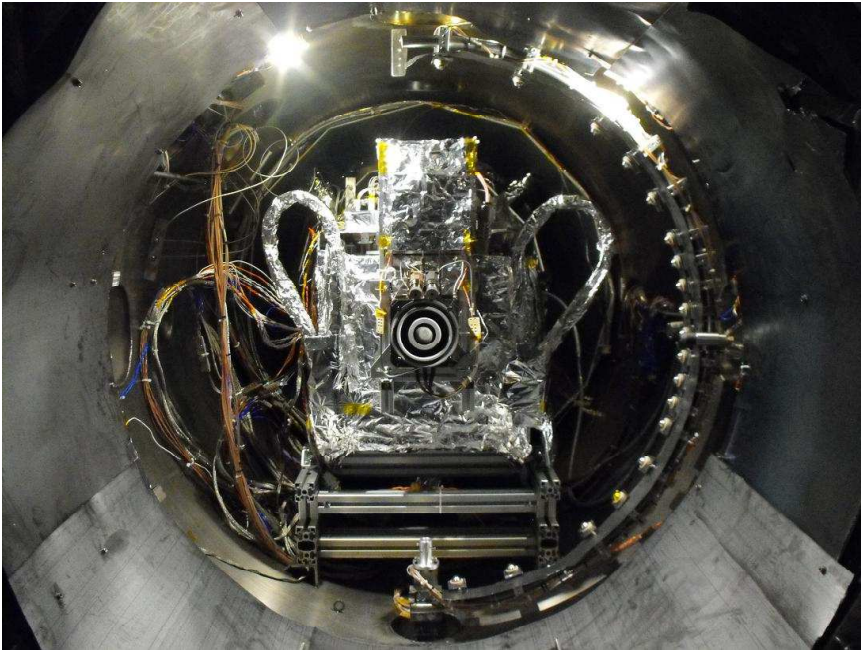
## HEMP-TIS Lifetest



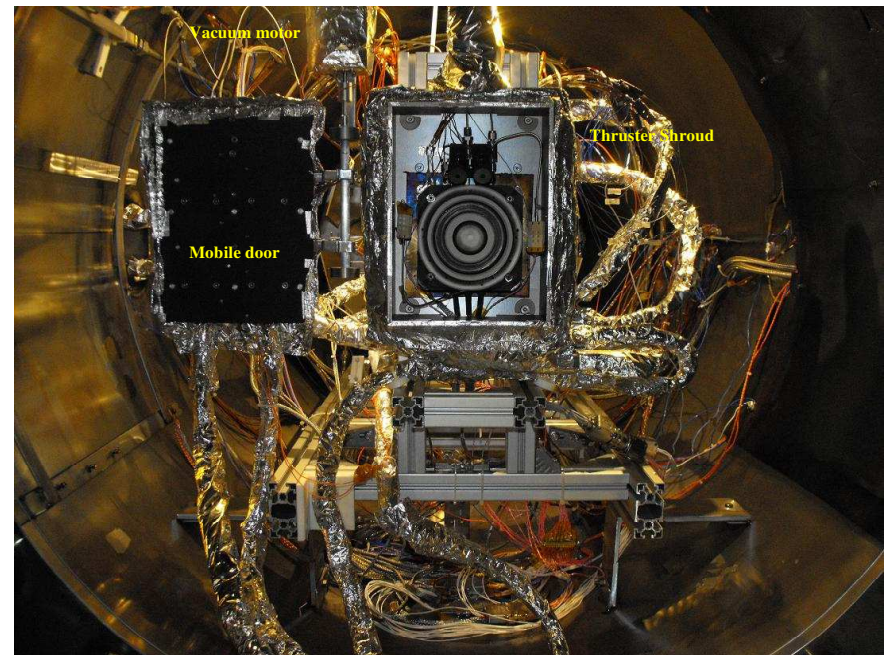


## Safran PPS®1350E Qualification programme

## Performance Characterisation

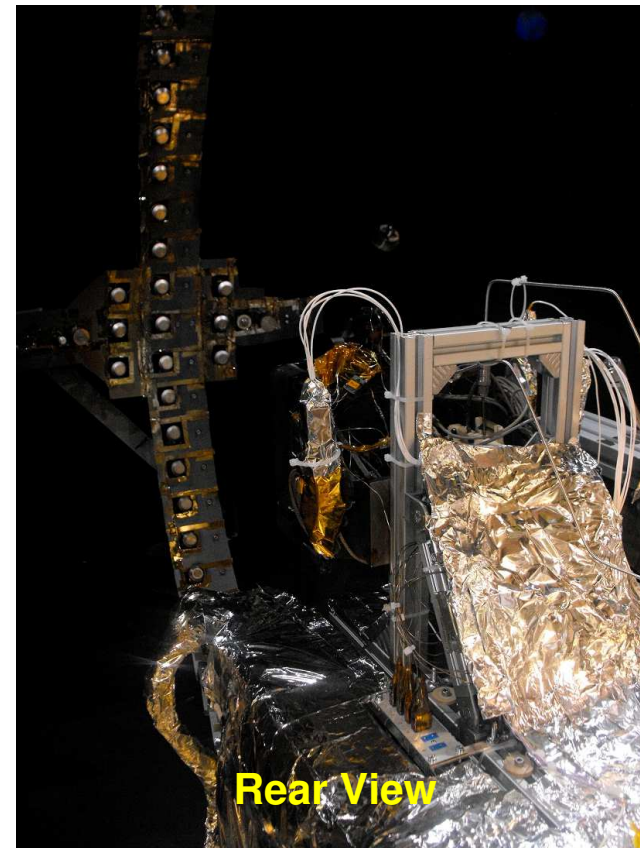
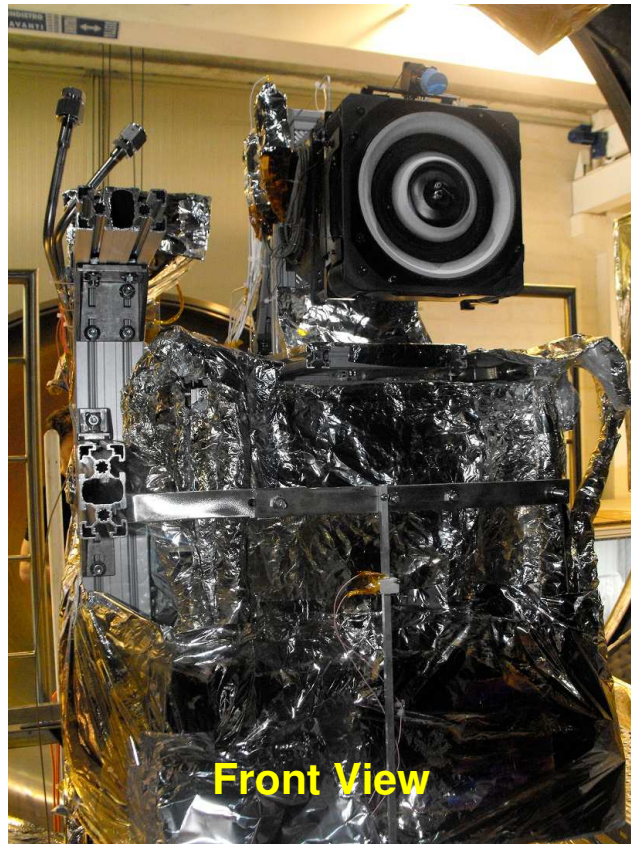


## Thermal Cycling



## Safran PPS®5000 Qualification programme

## Performance Characterisation







**Thank you !**



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